

provided that additional calibrations are made to ensure the accuracy of the calibration curves. The following procedure for calibration below 15 percent of full scale may be used:

(1) If a 16-point gas divider is used, 50 percent of the calibration points shall be below 10 percent of full scale. The gas divider shall conform to the accuracy requirements specified in § 92.112.

(2) If a 7- or 9-point gas divider is used, the gas divider shall conform to the accuracy requirements specified in § 92.112, and shall be used according to the following procedure:

(i) Span the full analyzer range using a top range calibration gas meeting the calibration gas accuracy requirements of § 92.112.

(ii) Generate a calibration curve according to, and meeting the applicable requirements of §§ 92.118 through 92.122.

(iii) Select a calibration gas (a span gas may be used for calibrating the CO₂ analyzer) with a concentration between the two lowest non-zero gas divider increments. This gas must be “named” to an accuracy of ± 1.0 percent (± 2.0 percent for CO₂ span gas) of NIST gas standards, or other standards approved by the Administrator.

(iv) Using the calibration curve fitted to the points generated in paragraphs (b)(2)(i) and (ii) of this section, check the concentration of the gas selected in paragraph (b)(2)(iii) of this section. The concentration derived from the curve shall be within ± 2.3 percent (± 2.8 percent for CO₂ span gas) of the gas’ original named concentration.

(v) Provided the requirements of paragraph (b)(2)(iv) of this section are met, use the gas divider with the gas selected in paragraph (b)(2)(iii) of this section and determine the remainder of the calibration points. Fit a calibration curve per §§ 92.118 through 92.122 for the entire analyzer range.

§ 92.128 Particulate handling and weighing.

(a) At least 1 hour before the test, place each filter in a closed (to eliminate dust contamination) but unsealed (to permit humidity exchange) petri dish and place in a weighing chamber meeting the specifications of § 92.110(a) of this section for stabilization.

(b) At the end of the stabilization period, weigh each filter on the microbalance. This reading is the tare weight and must be recorded.

(c) The filter shall then be stored in a covered petri dish or a sealed filter holder until needed for testing. If the filters are transported to a remote test location, the filter pairs, stored in individual petri dishes, should be transported in sealed plastic bags to prevent contamination. At the conclusion of a test run, the filters should be removed from the filter holder, and placed face to face in a covered but unsealed petri dish, with the primary filter placed face up in the dish. The filters shall be weighed as a pair. If the filters need to be transported from a remote test site, back to the weighing chamber, the petri dishes should be placed in a sealed plastic bag to prevent contamination. Care should be taken in transporting the used filters such that they are not exposed to excessive, sustained direct sunlight, or excessive handling.

(d) After the emissions test, and after the sample and back-up filters have been returned to the weighing room after being used, they must be conditioned for at least 1 hour but not more than 80 hours and then weighed. This reading is the gross weight of the filter and must be recorded.

(e) The net weight of each filter is its gross weight minus its tare weight. Should the sample on the filter contact the petri dish or any other surface, the test is void and must be rerun.

(f) The particulate filter weight (Pf) is the sum of the net weight of the primary filter plus the net weight of the backup filter.

(g) The following optional weighting procedure is permitted:

(1) At the end of the stabilization period, weigh both the primary and back-up filters as a pair. This reading is the tare weight and must be recorded.

(2) After the emissions test, in removing the filters from the filter holder, the back-up filter is inverted on top of the primary filter. They must then be conditioned in the weighing chamber for at least 1 hour but not more than 80 hours. The filters are then weighed as a pair. This reading is the gross weight of the filters (Pf) and must be recorded.

(3) Paragraphs (a), (c), and (e) of this section apply to this option, except that the word "filter" is replaced by "filters".

§ 92.129 Exhaust sample analysis.

(a) The analyzer response may be read by automatic data collection (ADC) equipment such as computers, data loggers, etc. If ADC equipment is used the following is required:

(1) The response complies with § 92.130.

(2) The response required in paragraph (a)(1) of this section may be stored on long-term computer storage devices such as computer tapes, storage discs, or they may be printed in a listing for storage. In either case a chart recorder is not required and records from a chart recorder, if they exist, need not be stored.

(3) If the data from ADC equipment is used as permanent records, the ADC equipment and the analyzer values as interpreted by the ADC equipment are subject to the calibration specifications in §§ 92.118 through 92.122, as if the ADC equipment were part of the analyzer.

(b) Data records from any one or a combination of analyzers may be stored as chart recorder records.

(c) Software zero and span.

(1) The use of "software" zero and span is permitted. The process of software zero and span refers to the technique of initially adjusting the analyzer zero and span responses to the calibration curve values, but for subsequent zero and span checks the analyzer response is simply recorded without adjusting the analyzer gain. The observed analyzer response recorded from the subsequent check is mathematically corrected back to the calibration curve values for zero and span. The same mathematical correction is then applied to the analyzer's response to a sample of exhaust gas in order to compute the true sample concentration.

(2) The maximum amount of software zero and span mathematical correction is ± 10 percent of full scale chart deflection.

(3) Software zero and span may be used to switch between ranges without adjusting the gain of the analyzer.

(4) The software zero and span technique may not be used to mask analyzer drift. The observed chart deflection before and after a given time period or event shall be used for computing the drift. Software zero and span may be used after the drift has been computed to mathematically adjust any span drift so that the "after" span check may be transformed into the "before" span check for the next mode.

(d) For sample analysis perform the following sequence:

(1) Warm-up and stabilize the analyzers; clean and/or replace filter elements, conditioning columns (if used), etc., as necessary.

(2) Leak check portions of the sampling system that operate at negative gauge pressures when sampling, and allow heated sample lines, filters, pumps, etc., to stabilize at operating temperature.

(3) Optional: Perform a hang-up check for the HFID sampling system:

(i) Zero the analyzer using zero air introduced at the analyzer port.

(ii) Flow zero air through the overflow sampling system, where an overflow system is used. Check the analyzer response.

(iii) If the overflow zero response exceeds the analyzer zero response by 2 percent or more of the HFID full-scale deflection, hang-up is indicated and corrective action must be taken.

(iv) The complete system hang-up check specified in paragraph (f) of this section is recommended as a periodic check.

(4) Obtain a stable zero reading.

(5) Zero and span each range to be used on each analyzer used prior to the beginning of the test sequence. The span gases shall have a concentration between 75 and 100 percent of full scale chart deflection. The flow rates and system pressures shall be approximately the same as those encountered during sampling. The HFID analyzer shall be zeroed and spanned through the overflow sampling system, where an overflow system is used.

(6) Re-check zero response. If this zero response differs from the zero response recorded in paragraph (d)(5) of this section by more than 1 percent of full scale, then paragraphs (d) (4), (5),